



Taxonomic Review of Korean Sericinae (Coleoptera, Melolonthidae) I : Genera *Serica* Mac Leay and *Nipponoserica* Nomura

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Abstract A taxonomic review of the genera *Serica* Mac Leay and *Nipponoserica* Nomura belonging to the subfamily Sericinae in Korea is presented. As a result, four species of the genus *Serica* including two new species, *S. hirsuta* sp. nov. and *S. lutea* sp. nov., and two species of the genus *Nipponoserica* including one new species, *N. opacicarina* sp. nov. are considered to distribute in the Korean peninsula. The keys to the species, descriptions of the three new species and illustrations of adult's morphological characteristics and aedeagi are provided.

Key words Taxonomy, *hirsuta* sp. nov., *lutea* sp. nov., *opacicarina* sp. nov., Korea

INTRODUCTION

Subfamily Sericinae is a small taxon of which the members feed mostly on grasses and fruit trees. There are approximately 160 genera and 1300 species all over the world. Among them, 45 species of the 11 genera are known to Korea, and among them, the genera *Serica* and *Nipponoserica* are reviewed in this paper.

Serica species are mostly distributed throughout the northern hemisphere and *Nipponoserica* species are usually distributed in Korea, Japan, China and Taiwan of East Asia. Until recently, six species of *Serica* and one species of *Nipponoserica* were recorded from Korea (Okamoto, 1924; Murayama, 1935, 1938; Kim and Lee, 1991). *Serica formosana* Moser was excluded from the Korean fauna by Kim (2001), *S. elliptica* was transferred to *Nipponoserica* according to the morphological characteristics (elongated body, hind tibia longitudinally undulated on outer side, apex of elytra membranous, aedeagus symmetric and so on) by Nomura (1973), and *S. brunnea* and *S. boops* are excluded from the Korean fauna in this paper. Among the *Nipponoserica* species, *N. similis* has been excluded by Kim (2001) due to wrong citation. In this paper, three species, *S. hirsuta* Kim et Kim sp. nov., *S. lutea* Kim et Kim sp. nov. and *N. opacicarina* Kim et Kim sp. nov., belonging to two genera, *Serica* and *Nipponoserica*, are described as new to science. Therefore, six species belonging to the two genera are reported in this paper.

Abbreviations are as follows: HB, Hamgyeongbuk-do; GW, Gangwon-do; GG, Gyeonggi-do; CB, Chungcheongbuk-do; CN, Chungcheongnam-do; GB, Gyeongsangbuk-do; GN, Gyeongsangnam-do; JB, Jeollabuk-do; JN, Jeollanam-do; JJ, Jeju-do; L, Length; W, Width; TL, Type locality.

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SYSTEMATIC ACCOUNTS

Genus *Serica* Mac Leay

Serica Mac Leay, 1819. Horae. Ent., 1: 146 (Type species: *Scarabaeus brunneus* Linné, 1758)

Trichoserica Reitter, 1896. Wien. Ent. Zeit., 15: 180

Ophthalmoserica Brenske, 1897. Berl. Ent. Zeit.: 345

Body oval. Hind femur generally shining. Hind tibia with 2–3 obliquely spinous ridges on outer side, not undulated. Dorsal surface with blackish spots, rarely without spots. Apex of elytra chitinous, rarely membranous. Aedeagus asymmetric with hook-shaped left paramere.

Distribution. This genus mostly distributes throughout the northern hemisphere.

Key to the Korean species of the genus *Serica*

1. Elytra with scattered blackish spots (scales) *septentrionalis*
- Elytra without spots 2
2. Elytra with regular hair line. Compound eyes large and their interval narrower than two times of its diameter. Distance ratio of each paramere to center of middle piece 1 : 1.5 (left : right) 3
- Elytra with irregular hair line. Compound eyes somewhat large but their interval wider than two times of its diameter. Distance ratio of each paramere to center of middle piece 1 : 3 (left : right) *hirsuta* sp. nov.
3. Body brown to dark brown. Elytral suture and outline dark-colored. Aedeagus connected straightly between middle piece and paramere *polita*
- Body and elytra yellowish brown to light brown. Aedeagus connected right angle between middle piece and paramere *lutea* sp. nov.

Serica septentrionalis Murayama, 1935 참우단풍뎅이

Serica septentrionalis Murayama, 1935, Journ. Chosen Nat. Hist. Soc. 20: 7 (TL: Korea-Hapsu); Murayama, 1937: 33; Sawada, 1937: 9; Murayama, 1938: 9; Miwa and Chujo, 1939: 54; Murayama, 1954: 29 (Korea-Hapsu, Bukyesu); Cho, 1957: 295; Cho, 1969: 650; Kim, 2001: 64.

Trichoserica septentrionalis: ESK & KSAE, 1994: 151.

Size. ♂-(L) 7–7.5 mm, (W) 4.2 mm; ♀-(L) 8 mm, (W) 4.5 mm.

Material examined. None.

Distribution. Korea (North).

Serica polita (Gebler, 1832) 북방우단풍뎅이

(Fig. 1. A–E)

Omaloplia polita Gebler, 1832, Nouv. Mem. Soc. Nat. Moscou II: 53.

Trichoserica fulvopubens: Reitter, 1896: 180.

Serica polita: Murayama, 1935: 2; 1937: 32; 1938: 7; 1941: 17; Miwa and Chūjō, 1939: 54; Sawada, 1937: 9; Cho, 1957: 295; Cho, 1969: 649; Nomura, 1972: 111; Kim, 2001: 62.

Trichoserica polita: Kim and Kim, 1972: 83; Kim and Lee, 1991a: 67; ESK & KSAE, 1994: 151; Kim and Kim, 1997: 170; Kim et al., 1998: 129.

Size. (L) 8.5–10 mm, (W) 4.7–5.5 mm.

Material examined. GW: Mt. Odaesan (♀, 27 VII 1958, anonymous; 7 ♀. 2 IX 1995, Kwon), Chokyung-dong Injae-gun (2 ♀, 24–26 VII 2000, Kim), Mt. Taebaksan (♀, 12–13 VIII 1999, Ku), Mt. Hambaeksan (4 ♂ ♀, 13–14 VIII 1999, Park), Mt. Gachilbong (♂, 24

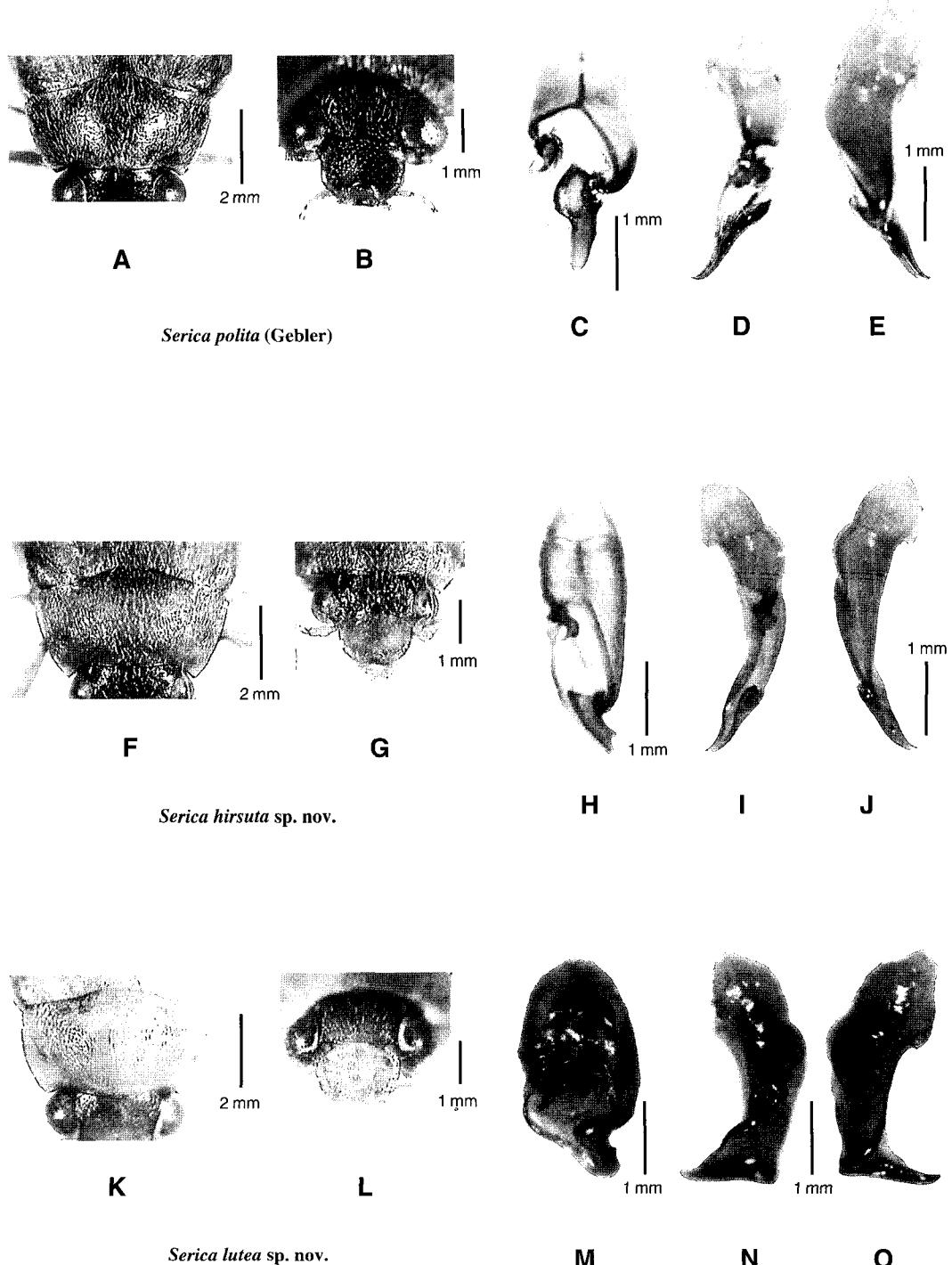


Fig. 1. *Serica polita*, *Serica hirsuta* sp. nov. and *Serica lutea* sp. nov. (A, F, K: Pronotum; B, G, L: Interval of compound eyes; C-E, H-J, M-O: Male aedeagus).

VII 1981, Nam); GG: Mt. Chunmasan (♀, 28 V 1978, Lee), Mt. Chukryungsan (♀, 12 VII 1980, Jang), Yongmun (♀, 31 V 1986, Jang), Mt. Myungjisan (♀, 6 VIII 1991, Hwang); CB: Yeongok-ri, Jinchun-myeon (♂, 8 VII 1998, Han); GB: Mt. Sobaeksan (♂, 24 VII 1974, Kim; 2 ♂, 4 IX 1993, Kim; ♂, 13–14 VIII 1999, Ku), Mt. Chungryangsang (♂ ♀, 29–30 VII 1990, Hwang); GN: Wulju Ulsan (♂, 22 VI 1989, Yang), Byuksoryung, Mt. Chirisan (♂, 22 ? 1984, anonymous), Hadong-gun (♂, 30–31 VII 1990, Kim), Machun-myeon, Hamyang-gun (♂, 27–28 VII 1992, Kim); JB: Mujukchundong (2♀, 16–21 VIII 1970, Kim); JN: Piagol, Mt. Chirisan (3♀, 23 VI 1987, Ku), Dapgok, Kwangyang (♀, 10 VIII 1993, Jang), Minryung (♂, 22 VII 1968, Y.); JJ: Joongmun (♀, 31 VII 1974, Lee).

Distribution. Korea (North, Central, South, Jeju Is.), China (Manchuria), Russia (Eastern Siberia).

Remarks. Murayama (1954), Nomura (1972) and Stebnicka (1980) recorded this species from the Korean peninsula. Their descriptions and the pictures of aedeagus, however, are different from each other, so we assume that they might have observed different specimens as different species. In other words, *S. polita* by Murayama (1954) is not agreed with that by Nomura (1973) and with that by Stebnicka (1980). Also Nomura (1973) referred the type specimens and he pictured aedeagus of the type. Therefore, we accept Nomura's *S. polita* and would consider the others (Murayama's and Stebnicka's) as the following new species.

***Serica hirsuta* Kim et Kim, sp. nov. 긴털우단풍뎅이 (신칭)**
(Fig. 1. F–J)

Trichoserica polita: Stebnicka, 1980, Acta Zool. Cracov. 24(5): 250–252 (Korea–Chünma-san) (misidentification).

Diagnosis. Body elongated oval, shiny and light brown to yellowish brown color. Compound eyes somewhat large but their interval twice as wide as its diameter.

Description. Male. Head. Clypeus yellowish with scattered moles having fine hair. Clypeal suture round shape. Vertex dark with moles having fine hair. Antenna 9-segmented including 3-segmented club. Male club longer than twice of stalk in length. Thorax. Pronotum narrowed anteriorly and with moles having hairs on the surface. Scutellum elongated triangle with densed moles. Elytra shiny, striae with irregular moles having semi-decumbent hairs. Moles rare on the interstice. Fore-tibia with two spurs. Pretarsal claws of male different each other. Interval of mid coxae narrower than that of mid femur. Moles and setae scattered over the hind femur. Hind tibia wrinkled perpendicularly with setae. Spurs of hind tibia thick and short. Each tarsal claw three-forked. Abdomen. Pygidium flat triangular, rise up on the middle, velvety without shining, and with dense hairs. Abdominal sternites not shiny, with small and fine hairs and setae irregularly. Aedeagus. Middle piece short and divided asymmetrically at the end so that the large and flat right part elongated and the small left part toward left. Female. Almost same with male's characteristics, but antennal club shorter than stalk in length. Size. (L) 7.3–9.8 mm, (W) 3.8–5 mm.

Type series. Holotype. GW: Mt. Bangtaesan, Hanam-ri, Injae-gun (♂, 26 VI 1996, JI Kim and SY Kim) Paratypes. GW: Kangchon (♀, 19 VI 1974, DH Yang), Mt. Gachilbong, Hongchun-gun (♀, 22 IV 1984, KC Lee), Mt. Bangtaesan, Injae-gun (5♀, 24–26 VI 1996, JI Kim), Mt. Kariwangsan, Jungsun-gun (♂, 21 V 1998, BY Kim *et al.*); GG: Mt. Wangbangsan (4♀, 5 VI 1977, UW Suh; ♀, 29 V 1983, MY Song; ♀, 30 VI 1984, HC Park); GB: Mt. Sobaeksan (♀, 23 VII 1974, CH Kim; 2 ♂, 5–6 VI 1981, CS Lee), Mt. Juhulsan, Munkyung-si (♂, 24 V 1997, JI Kim); GN: Gajua-dong, Jinju-si (♀, 4 VI 1986, YH Paek); JN: Piagol, Mt. Chirisan (2 ♂, 19 VI 1982, SH Nam; ♂ 3♀, 23 VI 1987, SJ Ban *et al.*; ♂, 21 V 1998, SH Jeon).

Other materials examined. GW: Mt. Chiaksan (♂, 6 VI 1974, Hwang); GG: Mt. Wangbangsan (2 ♂, 2 VI 1985, Nam), Temp. Bokwang (♀, 12 VI 1978, Lee), Mt. Chunmasan (♀, 8 VI 1968, Kim; ♂, 2 VI 1984, Hyeon), Suwon-si (♀, 15 V 1994, Shin), Mt. Yongmunsan (♂ ♀, 28 V 1982, Shin; ♂, 31 V 1986, Kim), Mt. Angmubong (♀, 23 VI 1974, Nam), Wuidong (♀, 19 VI 1982, Bae), Mt. Dobongsan (♂, 5 V 1994, Shin); GB: Munkyungsejae (♀, 10 VII 1977, Kim; ♀, 26 V 1996, Kim), Mt. Hwanghaksan (♀, 4 VI 1978, Lee), Mt. Sundalsan, Yungju-gun (♀, 29 VI 1998, Kim), Mt. Juwangsan (♀, 5 IV 1989, Park), Kyungsan-si (♂, 23 V 1989, Kim); JB: Mujukuchundong (♂, 9 VI 1972, Yu); JN: Mt. Chirisan (♀, 24 VI 1986, Kwak), Baekmudong, Mt. Chirisan (♀, 16 VII 1984, Ku), Mt. Chokyesan (♀, 22 VI 1987, Jang).

Distribution. Korea (Central, South).

Etymology. The species name of *S. hirsuta* is derived from its dense hair over the entire body.

Remarks. It has been recorded as *Trichoserica polita* by Stebnicka (1980) from the Korean peninsula. However, it is smaller than *S. polita*, its compound eyes are less projected, and the elytra color is entirely uniform. With the character of aedeagus described above, this new species can be separated from others.

Serica lutea Kim et Kim, sp. nov. 황색우단풍뎅이 (신칭)

(Fig. 1. K-O)

Serica polita: Murayama, 1954, Trans. Biol. Soc. Manchoukuo 4(1): 23 (Korea) (misidentification).

Diagnosis. Body elongated oval, yellowish and shiny. Compound eyes clearly large and the interval narrower than two times of its diameter.

Description. Male. Head. Clypeus yellowish and shiny with scattered moles having fine hairs. Vertex black with moles and fine hairs. Antenna 9-segmented including 3-segmented club. The length of male club twice as long as stalk. Thorax. Pronotum wide, narrowed anteriorly and moles with hairs scattered on the surface. Scutellum elongated triangle shape with dense moles having hairs on the entire surface. Elytra yellowish and shiny, dark moles irregularly scattered on the striae and interstice with few moles. Fore tibia with two spur. Pretarsal claws of male different from each other. Interval of midcoxae narrower than width of mid femur. Hind femur with scattered moles and some hair. Hind tibia wrinkled perpendicularly with setae. Spurs of hind tibia thick and short. Abdomen. Pygidium triangular, lusterless, velvety with scattered hairs, and somewhat convex on the middle. Abdominal sternites yellowish, lusterless, with small and fine hairs and robust setae. Aedeagus. Middle piece somewhat large, swollen at base and ends splitted asymmetrically. Left paramere short and bifurcated at the end. Right paramere elongated, flated, and having small projection to outside. Female. Almost same with male's characteristics, but club shorter than stalk in length and the body size somewhat large. Size. (L) 6–9.5 mm, (W) 3–5 mm.

Type series. Holotype. GG: Temp. Bokwang (♂, 29 V 1975, YS Choi) Paratype. GG: Mt. Surisan (♀, 18 VI 1978, JS Lee).

Distribution. Korea (Central).

Etymology. The species name of *S. lutea* is derived from the yellowish color on body.

Remarks. It has recorded as *Serica polita* by Murayama (1954) from the Korean peninsula. However, we accepted Nomura's opinion (1973) and would retreated Murayama's record as a new species. This is very similar to *Serica hirsuta* sp. nov. but the body color is more yellowish, antennal club of male is shorter than twice of stalk in length, and aedeagus is swollen at base of left paramere.

* Eliminated species from the Korean fauna of the genus *Serica*

1. *Serica brunnea* (Linné) (Syst. Nat. 10: 352, 1758 (Scarabaeus))

The first record of *Serica brunnea* in Korea was by Murayama (1938), but he's descriptions (1938, 1954) and the specimens of Kim (2001) were not agreed with the type specimens from the Natural History Museum in London. Also, the specimens of Kim (2001) are close to *Nipponoserica* because of their characteristics—Hind femur opaque, apex of elytra membranous, and aedeagus symmetrical. Therefore, we removed this record from *Serica* and put the specimens under a new species of *Nipponoserica*.

Type specimen: *Serica brunnea* Linne from the Natural History Museum.

2. *Serica boops* Waterhouse (Trans. Ent. Soc. London: 101, 1875)

Since Okamoto (1924) first recorded it, others (Murayama, 1937; Miwa and Chujo, 1939; Cho, 1957; Kim, 2001) have only cited his record. However, it has never been found since Okamoto recorded it. In the original description, the type locality is Hiogo in Japan and blackish spot on the elytra is an important character. However, nobody have mentioned about the character. We consider that this is a species to be excluded from the Korean fauna because Okamoto, who is not a specialist of Sericinae, recorded it in his faunistic report and the result is not to be trusted.

Genus *Nipponoserica* Nomura

Nipponoserica Nomura, 1973, Tôhô-Gakuhô 23: 139 (Type species: *Serica similis* Lewis, 1895).

Body elongated oval. Hind femur opaque, rarely shines pearly. Hind tibia longitudinally undulated outer side. Dorsal surface without blackish spots and dense hairs. Apex of elytra membranous. Aedeagus almost symmetric.

Distribution. Korea, Japan, China and Taiwan.

Key to the Korean species of the genus *Nipponoserica*

1. Body 8–11 mm and dark brown color. Antennal club 1.2–1.5 times longer than stalk.
Anterior angle of pronotum rounded. Last line on elytra of male very distinct *elliptica*
- Body 6.5–8.5 mm and yellowish brown to brown color. Antennal club 1.5–1.8 times longer than stalk. Anterior angles of pronotum almost subrectangular. Last line on elytra of male indistinct near the middle *opacicarina* sp. nov.

***Nipponoserica elliptica* (Murayama) 조롱박우단풍뎅이**

(Fig. 2. A–F)

Serica elliptica Murayama, 1938, Annot. Zool. Japan 17(1): 17 (TL: Korea—Mt. Hallasan, Gwangneung); 1954: 32; Cho, 1963: 217; 1969: 650; Kim and Nam, 1982: 154; Kim and Lee, 1991b: 55.

Nipponoserica elliptica: Kim, 2001: 61.

Size. (L) 8–11 mm, (W) 4.4–6.5 mm.

Material examined. CB: Baekgok-myeon, Jinchun (♂, 7 VII 1998, Han); CN: Mt. Baekhwasan, Taean-gun (♂, 2 VI 2001, Kim); GN: Jinju-si (♀, 11–17 V 1991, anonymous); JB: Namwon-gun (♂, 25–26 VII 1990, Kim).

Distribution. Korea (Central, South, Jejudo).

***Nipponoserica opacicarina* Kim et Kim, sp. nov. 무태날개우단풍뎅이 (신칭)**

(Fig. 2. G–L)

Serica brunnea: Murayama, 1938, Annot. Zool. Japan 17(1): 9 (Korea) (misidentification); Kim, 2001: 62

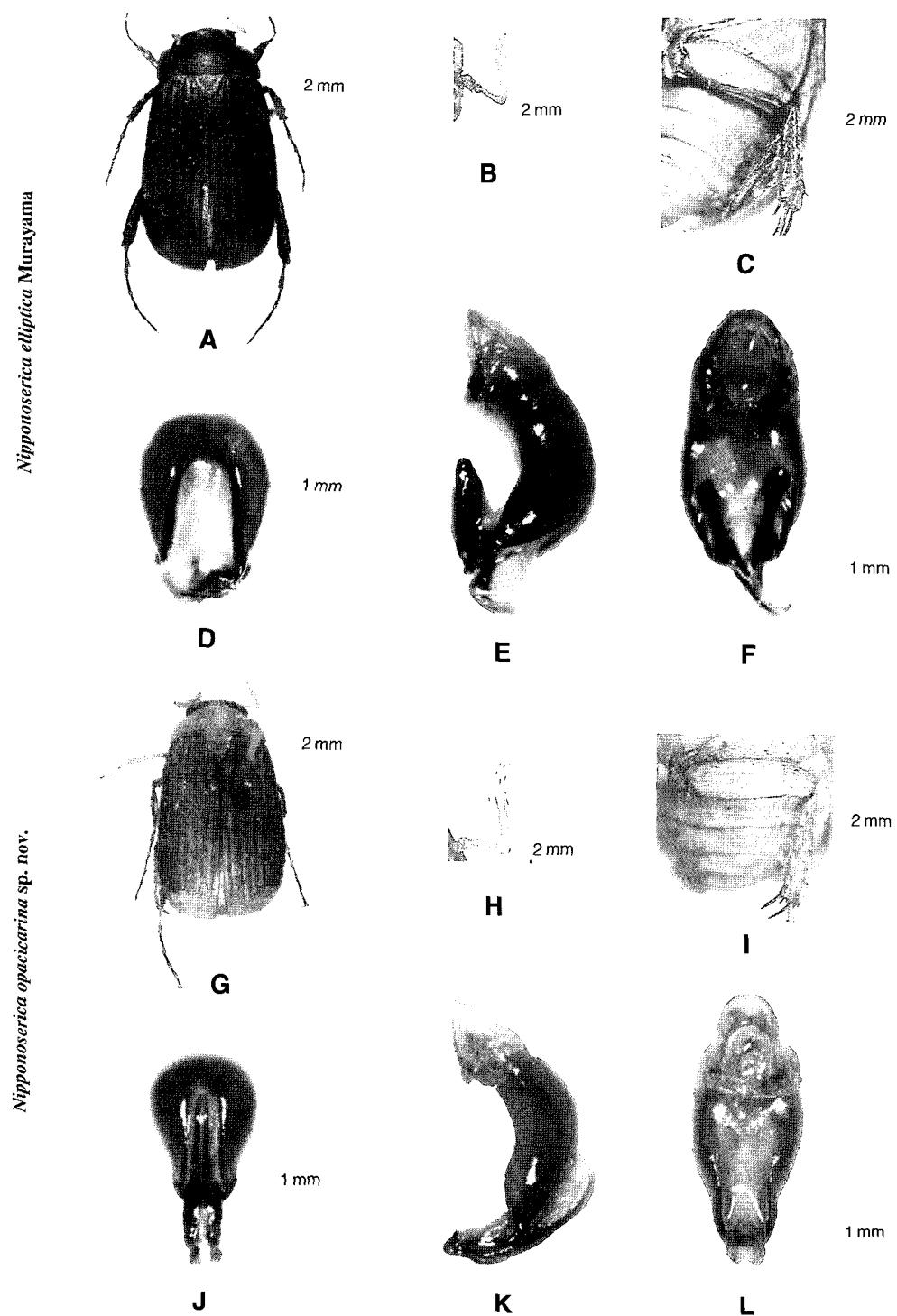


Fig. 2. *Nipponoserica elliptica* and *Nipponoserica opacicarina* sp. nov. (A, G: Body; B, H: Antenna; C, I: Hind femur; D-F, J-L: Male aedeagus).

(Korea-Central).

Maladera kamyai: Kim and Chang, 1987: 104 (Korea) (misidentification).

Diagnosis. Body oval, wide at rear, yellowish brown to dark brown and velvety without shining. Outer line on male elytra indistinct on the middle.

Description. Male. Head. Clypeus shiny with some moles on surface, narrowed anteriorly. Vertex pearly shiny with scattered moles. Compound eyes projected slightly. Antenna yellow and 9-segmented including 3-segmented club. Male club almost twice of stem in length. Thorax. Width of pronotum almost twice of length. Scutellum somewhat elongated with scattered moles. Elytra elongated, almost two times as long as the width of pronotum. Striae with dense moles but interstice with a few. A line of setae along the outline of elytra. First line from outside indistinct near middle. Abdominal side of pronotum lusterless with moles. Interval between mid coxae as narrow as half of mid femur width. Mid and hind tibia with vertical groove and some setae. Abdomen. Pygidium flat, triangular. Abdominal sternites lusterless or pearly shiny with setae crosswise on the middle. The second sternites from pygidium with vertical groove as in *N. elliptica* and the sides rise up somewhat. Aedeagus. Symmetrical. Middle piece splitted from the base. Symmetrical parameres adhered the end of middle piece. The base of paramere elongated toward the opening of splitted middle piece. End of paramere stubby. Female. Almost same with male's characteristics, but the antennal club shorter than the stalk in length. Size. (L) 6.5–8.5 mm, (W) 4–5 mm.

Type series. Holotype. JB: Naesosa, Buan-gun (♂, 22 V 1992, HA Lee) Paratypes. GW: Bukpyung-gun (♀, 26 VI 1984, Bang) GG: Mt. Chunmasan (♀, 23 V 1984, Lee), Mt. Kwanaksan (♀, 23 V 1988, Lee) GB: Ahndong-gun (♂, 10 VIII 1987, KS Lee), Daehyun, Sukpo, Bonghwa (♀, 24 VII 1986, JI Kim) JN: Temp. Baekyang, Jangsung-gun (♂, 24 V 1994, JI Kim).

Other materials examined. GB: Temp. Heebang, Mt. Sobaeksan (♂, 7 VI 1974, Park); GN: Mt. Bibongsan, Sangbongsuh-dong, Jinju-si (♂, 7 V 1984, Oh; ♂ ♀, 1–22 VI 1984), Sanchung-myeon (♀, 3 VI 1992, anonymous); JB: Buan-gun (♂, 11 V 1992, Lee), Temp. Sunwun, Gochang-gun (♂, 21 V 1992, Oh).

Distribution. Korea (Central, South).

Etymology. This species is distinct because lateral carina of elytra is opaque near the middle. The scientific name is derived from the combination of “opaque” and “carina”.

Remarks. This was first recorded from the Korean peninsula as *Serica brunnea* by Murayama (1938). Based on the morphological characters and especially aedeagus, however, it should be considered as a different species belonging to a different genus as Nomura (1973) mentioned. We confirmed it again through the comparison with the voucher specimen of *S. brunnea*. There are some specimens agreed with Murayama's description (1954) among the observed Korean specimens and they have the diagnostic characteristics that are belonging to *Nipponoserica*. Therefore we would treat this as a new species.

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